

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7236

Petition by Northern Power Systems, Inc. for a)
Certificate of Public Good pursuant to 30 V.S.A.)
§ 248(j) authorizing the construction of an energy)
generation and distribution network known as the)
MadGrid Project in Waitsfield, Vermont)

Order entered: 1/31/2007

I. INTRODUCTION AND PROCEDURAL HISTORY

On October 11, 2006, the Vermont Public Service Board ("Board") received from Northern Power Systems, Inc., ("Northern") a petition pursuant to 30 V.S.A. § 248(j) requesting a certificate of public good ("CPG") to authorize Northern to construct an energy generation and distribution network,¹ referred to as the MadGrid Project ("MadGrid" or "the Project"), in Waitsfield, Vermont. The Project would be located within the service territory of Washington Electric Cooperative, Inc. ("WEC"). Northern filed a proposed CPG and proposed findings of fact with its petition pursuant to the requirements of 30 V.S.A. § 248(j)(2).

On November 3, 2006, the Board issued notice that a workshop would be held on November 6, 2006, to clarify certain aspects of the petition. The workshop was attended by representatives from Northern, WEC, and the Vermont Department of Public Service ("Department" or "DPS"). The workshop participants agreed that the transcript of the workshop could be used to support findings of fact in this Docket.² Also discussed at the workshop was whether a certificate of public good pursuant to 30 V.S.A. § 231 is required (this issue is addressed in Section II, below).

1. The caption filed with Northern's original petition described the Project as "an energy generation, storage and distribution network." Because the petition and accompanying prefiled testimony do not describe, nor do they request approval for, any energy storage, we have deleted the word "storage" from the caption for this Docket. If Northern wishes in the future to include energy storage as part of the Project, it must seek an amendment to the CPG issued in this Docket. *See* tr. 11/6/06 at 60-61 (Tarrant, Johnson).

2. *See* tr. 11/6/06 at 78.

On November 15, 2006, Northern, in response to a suggestion by the Department, filed a letter, dated November 13, 2006, clarifying an apparent inconsistency in Northern's testimony regarding harmonic reduction of the transformers at Northern's building. On November 22, 2006, the Board issued a memorandum requesting that Northern and WEC file, by December 8, 2006, further clarification on the issue of liability. On December 7, 2006, Northern filed the requested information.

Notice of Northern's petition was issued on November 17, 2006, to all parties specified in 30 V.S.A. § 248(a)(4)(C) and to all other interested parties. The notice stated that persons wishing to submit comments as to whether the petition raises a significant issue with respect to the substantive criteria of 30 V.S.A. § 248 must file their comments with the Board on or before December 19, 2006. A similar notice of the filing was published in the *Times Argus* on November 21 and 28, 2006. In addition, the Board issued to the *Times Argus* a Media Release describing the MadGrid proposal.

On December 19, 2006, the Department filed a letter stating that:

The Department has reviewed the filings made by the Petitioners including the letter from Petitioner's counsel to the Public Service Board dated November 13, 2006, and has communicated separately with the Petitioners and personnel from Washington Electric Cooperative. The Department has received satisfactory answers to all of its inquiries. Based upon all of this information, the Department concludes that the petition does not raise any significant issues with respect to the substantive criteria of 30 V.S.A. § 248.

No other comments were received.

II. APPLICABILITY OF 30 V.S.A. § 231

It was agreed that the workshop participants would submit filings with the Board by November 10, 2006, regarding whether they believed Section 231 approval would be required. On November 9, 2006, Northern filed a letter stating that Section 231 approval is not necessary because, under the special circumstances of the Project, Northern is not a "business over which the public service board has jurisdiction under the provisions of [30 V.S.A. Chapter 5]." On November 9, 2006, the Department filed a letter stating that the DPS concurs with Northern's conclusion that approval pursuant to 30 V.S.A. § 231 is not required. No other comments have been received to date. The Board has reviewed the filings by Northern and the Department, and

has determined that Northern need not obtain approval pursuant to 30 V.S.A. § 231 to construct and operate the Project as proposed, given the specific circumstances presented: i.e., the Project is a non-commercial research and development project; the Project will be controlled by a distribution switch that is owned by an entity (WEC) with a CPG; and Northern will not be selling any of the output of the Project. Under these specific circumstances, and in light of the requirement of 30 V.S.A. § 203 that the Board's "jurisdiction shall be exercised . . . so far as may be necessary to enable [the Board] to perform the duties and exercise the powers conferred upon [it] by law," we conclude that Northern need not obtain a Section 231 CPG.

III. REVIEW PURSUANT TO 30 V.S.A. § 248

The Board has reviewed the petition and accompanying documents and has concluded that, pursuant to 30 V.S.A. § 248(j), a CPG should be issued to Northern without the notice and hearings otherwise required by 30 V.S.A. § 248. Although WEC is not a petitioner to this proceeding, the Project would be located within a small portion of WEC's service territory. However, by allowing Northern to construct the Project within WEC's service territory, WEC would not "purchase electric capacity or energy from outside the state" or "invest in an electric generation or transmission facility located outside this state" pursuant to 30 V.S.A. § 248(a)(1)(A), and (B). In addition WEC is not proposing to "begin site preparation for or construction of an electric generation facility or electric transmission facility within the state" pursuant to 30 V.S.A. § 248(a)(2)(A).

IV. FINDINGS OF FACT

DESCRIPTION OF EXISTING CONDITIONS AND THE PROPOSED PROJECT

1. Northern is a "person" as defined by 10 V.S.A. § 6001(14) and set forth within Section 248(a)(2)(A). Northern currently operates its distributed energy systems company out of its general office building located at 182 Mad River Park in Waitsfield, Vermont, and has over thirty years of experience of engineering and installing on-site power systems, often in remote locations throughout the world that have an unreliable utility connection or none at all. Pet. at 1-2.

2. WEC, whose offices are located at 75 VT Rte. 14 in East Montpelier, Vermont, is a company as defined by 30 V.S.A. § 201 and as such is subject to the Board's jurisdiction pursuant to 30 V.S.A. § 203. Pet. at 2.

3. The proposed project seeks to construct and test an advanced distributed generation system (microgrid) concept at the Mad River Park in Waitsfield. It will be known as Northern's MadGrid power network system. Lynch pf. at 3.

4. Northern received technical and financial assistance for the proposed microgrid concept from the U. S. Department of Energy ("DOE") and the National Renewable Energy Laboratory ("NREL"). Pet. at 1-2; Lynch pf. at 9.

5. The Project would be constructed by installing a switch on WEC's existing distribution pole # 150-L34 located on North Fayston Road (or a replacement in place of that pole), near the end of a nine-mile, three-phase radial distribution feeder. In addition, a communication link (via either wireless radio or fiber optic cable) would connect the switch to Northern's system supervisory control, which sets base load and power load factor for each generator. The switch would be operated by an SEL-351 Relay. Weston pf. at 5, 9; exh. NPS-HH-2 at 4; exh. NPS DW-1; tr. 11/6/06 at 10-11 (Linton), 63 (Weston).

6. WEC would own and (with the assistance of Northern) maintain the distribution switch. Northern would normally operate the switch, with a provision for WEC to cause the system to revert to normal utility supply and operate the switch manually without any generators on-line. WEC will also have manual isolation and bypass switches available. Weston pf. at 6; exh. NPS-DW-3 at 25, 26.

7. The MadGrid power network service area (i.e., downstream of the switch) would initially include five commercial and industrial facilities and up to twelve residences. The Project may be expanded in the future to include additional commercial/industrial facilities or residences. Lynch pf. at 3; exh. NPS-DW-2; tr. 11/6/06 at 51, 54 (Weston).

8. The four existing generation units within the MadGrid are a 267 kW propane-fired engine generator,³ a 100 kW biodiesel engine generator, a 30 kW propane-fired microturbine, and a 1.5 kW array of photovoltaic panels. The 267 kW generator and the photovoltaic panels reside at Northern's Building No. 2 and would be connected through WEC's 500 kVA transformer which serves that building. The 100 kW biodiesel unit resides at Northern's Building

3. The unit is rated at 280 kW for natural gas, and derated to 267 kW if run on propane. Northern would run the unit with propane as the fuel. See tr. 11/6/06 at 65-66 (Linton).

No. 1 and would be connected through WEC's 300 kVA transformer which serves that building. The 30 kW micro-turbine generator is located at BBT North America Corporation's ("BBTNA") office building, also located within the Park. The 30 kW micro-turbine is a back-up generator providing critical load support for BBTNA. Lynch pf. at 3; Weston pf. at 4-5; exhs. NPS-JL-2 through JL-5; tr. 11/6/06 at 7-8, 13-14 (Linton).

9. During the past couple of years Northern has used the 100 kW diesel and the 200 kW propane generators as backup power during outages. The PV array has been operating continuously whenever the sun is shining on the photovoltaics, and the micro turbine at BBTNA has been operated occasionally during power outages. Tr. 11/6/06 at 15 (Linton).

10. The Project may be operated in several modes. The fast switch would enable the Project to operate either in "utility parallel" mode or "islanded" mode. When the Project is operating in utility parallel mode, the distribution switch would be closed and the MadGrid generators would supply an amount of power necessary to supply the instantaneous loads present within the MadGrid service area. This will be accomplished by controlling the generator power level to maintain a small power import at the distribution switch. Power would not be exported to the remaining WEC system outside of the MadGrid. Lynch pf. at 3; Weston pf. at 5, 6, 7; exh. NPS-JL-3; exh. NPS-DW-3 at 24; exh. NPS-HH-2 at 11; tr. 11/6/06 at 34-36 (Linton, Weston, Johnson).

11. During an outage on the WEC system, the fast switch would open, and the MadGrid would be islanded from the remainder of the WEC system. During islanded mode, the MadGrid generators would supply power to the businesses and residences within the MadGrid. Weston pf. at 5.

12. The following additional operating modes would also be available: (1) each building may operate in utility parallel with power import controlled at Northern's building service entrance; (2) each building may be powered and islanded from WEC and the business park; and (3) Northern's generators may also be disconnected from WEC and from Northern's building load, supporting testing in Northern's lab. Weston pf. at 6-7.

13. The initial estimate of MadGrid load was 140 kW when Northern started the project. The most recent estimate for the MadGrid load is 240 kW. There has been some growth in the loads within the business park. Tr. 11/6/06 at 25 (Linton).

14. In the event of an outage on the WEC distribution system, when the MadGrid would be operating islanded from WEC, the 267 kW generator would be the prime element to supply power to other customers in the MadGrid. The 30 kW and 100 kW generators would provide back-up to the buildings they serve, and would therefore reduce the load on the 267 kW generator. Tr. 11/6/06 at 27-28, 30 (Linton).

15. As part of the Project, Northern intends to capture the waste heat from the 267 kW generator and use it for heat in Northern's adjacent building. Although the 267 kW generator and the building currently exist on the site, part of this project involves the installation of piping to connect the 267 kW generator to the building's heating loop. Tr. 11/6/06 at 58 (Linton).

16. The MadGrid is a research and development project that would last for five years. Following commissioning, Northern plans to run in parallel with WEC 24 hours a day for a minimum of a five-day period. After that, generation would run during business hours (approximately 8 A.M. to 5 P.M.) for a period of at least an additional ten business days. These first few weeks would allow Northern to check utility parallel operation. After these initial periods, and for the remainder of the five-year period, generation would operate in stand-by, running generators and islanding the business park only during times when WEC may experience utility outages. There may also be some other periods where Northern, in coordination with WEC, would conduct testing either in utility parallel or islanded mode for short periods of time. Lynch pf. at 6; Weston pf. at 5-6; tr. 11/6/06 at 18-20 (Linton, Tarrant), 37-39 (Tarrant, Johnson).

17. The Madgrid project has been and would continue to be cost-neutral to WEC for the project's duration. In fact, during outages on the WEC system, some amount of energy will be obtained by a handful of WEC customers at no cost to WEC. Lynch pf. at 9-10.

REVIEW OF THE PROJECT UNDER THE SECTION 248 CRITERIA**Orderly Development of the Region**

[30 V.S.A. § 248(b)(1)]

18. The Project will not unduly interfere with the orderly development of the region, with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of municipal legislative bodies, and the land conservation measures contained in the plan of the affected municipality. This finding is supported by Findings 19 through 22, below.

19. The Waitsfield Town Plan encourages the efficient use of energy resources, and encourages the use of renewable energy. Exh. NPS_TJC-5 at 69-72.

20. The Project as proposed complies with the Waitsfield Town Plan, and the Town of Waitsfield supports the Project. Clapp pf. at 8-9.

21. Although the Central Vermont Regional Plan ("CVRP") does not specifically address microgrid technology, the CVRP does state that "we must begin now to reduce the magnitude of fossil fuel consumption in our society" for reasons including that a high percentage of each household energy dollar permanently leaves the community, and that the combustion of fossil fuels contributes to the greenhouse effect, acid deposition, and declining air quality. Exh. NPS_TJC-6 at 30.

22. The Project is consistent with the goals and principles of the CVRP. Clapp pf. at 9-10.

Need for Present and Future Demand for Service

[30 V.S.A. § 248(b)(2)]

23. The Project is required to meet the need for present and future demand for service which could not otherwise have been provided in a more cost-effective manner through energy conservation programs and measures and energy efficiency and load management measures. This finding is supported by Findings 24 and 28, below.

24. By producing electricity close to the end users, rather than generating and transmitting it from large, far-away central power stations, microgrids can offer greater efficiency and reliability than traditional generation and transmission models. Lynch pf. at 4.

25. The Project would avoid transmission losses inherent in moving electricity long distances. Lynch pf. at 6.

26. The Project would achieve more efficient energy conversion by generating, in addition to electricity, useful thermal energy that can be captured and used on site for space heating or industrial processes. Being more "scale appropriate" allows energy conversion stations to be more easily and economically sited to take advantage of the efficiency of cogeneration of electrical energy and thermal energy for end users, thus increasing the efficiency of the overall energy conversion process more than 200% (i.e., from 30% to approximately 70% efficient). Lynch pf. at 6.

27. The Project does not involve the construction of any new generation or transmission capacity. The Project would utilize four existing generation units and existing distribution lines. Lynch pf. at 4-6, 8.

28. The Project is a research and development project to be conducted for a period of five years. Lynch pf. at 6, 9; Weston pf. at 13; tr. 11/6/06 at 37-39 (Tarrant, Johnson).

System Stability and Reliability

[30 V.S.A. § 248(b)(3)]

29. The Project will not adversely affect system stability and reliability. This finding is supported by Findings 30 through 38, below.

30. The operation of the generators in parallel with the WEC system should not result in voltage swings outside of the accepted range and duration. Crocket pf. at 5-6; Hurtado pf. at 6-7.

31. There will be no voltage flicker associated with the operation of the generators. The generators are brought up to synchronous speed and energized prior to their connection to the system so that there is no in-rush current. Crocket pf. at 6.

32. The addition of the generators to the WEC system will result in an increase in the available fault current in that area; the increase in fault current should not result in coordination or equipment rating problems on the WEC system. The existing three-phase ground-fault current is 530 amperes. The MadGrid system will contribute an additional 100 amperes, which is well below the rating of the hydraulic and electronic reclosers serving the area. Some re-coordination of the fusing may have to be done to assure coordination at the higher maximum fault level but

the increase in fault current should improve coordination for high impedance faults. Crocket pf. at 6; Hurtado pf. at 8-9.

33. The fast switch would be set to trip faster than the reclosing speed of the WEC reclosers. The closest recloser is a 35 amp, 4H recloser with a reclosing time of 90 cycles. The fast switch would be set to trip in 2-3 cycles, which would assure that it will be off-line before the breaker recloses. This would assure that the breaker would not try to close on an unsynchronized system. In addition, the fast switch would be set to not close until the WEC voltage has stabilized for a specific time, such as 3-5 minutes. Under this configuration, the fast switch would not open or close while the WEC reclosers are trying to clear a fault. Crocket pf. at 6-7; exh. NPS-HH-2 at 10.

34. The Project is designed to improve power reliability to those WEC customers within the MadGrid. It should have no adverse impact on power quality to WEC customers. WEC customers will not experience any voltage transients due to the Project because all normal switching will be synchronized and all load transfers will be ramped. Crocket pf. at 8.

35. The System Impact Study indicates that it would not be necessary to reconfigure the connection of the transformers at Northern's building to result in an appropriate level of harmonic reduction. The DTE Energy 267 kW generator is rated to meet IEEE Standard 519: "Recommended Practices & Requirements for Harmonic Control in Electrical Power Systems." Nevertheless, Northern has agreed to closely monitor, in conjunction with WEC, the harmonic output under actual operating conditions during the commissioning of the Project. Northern has further stated that it would take appropriate actions to either implement a remedy, or curtail microgrid operations if, for whatever reason, it becomes necessary. Hurtado pf. at 9; exh. NPS HH-2 at 7; exh. NPS-DW-3 at 25; letter dated November 13, 2006, from Gerald R. Tarrant, on behalf of Northern, to Kurt R. Janson, Vermont Public Service Board.

36. The protective equipment proposed by Northern is sufficient to protect customers on the WEC system (both inside and outside of the MadGrid) from faults on the MadGrid generators. Exh. NPS-HH-2 at 9-15; tr. 11/6/06 at 67-70 (Linton, Hurtado, Weston, Crocket).

37. The amount of generation comprising the MadGrid is not of sufficient capacity to adversely impact the Vermont Electric Power Company or ISO New England transmission systems. Hurtado pf. at 11.

38. The Project would not export power outside of the MadGrid. Weston pf. at 6, 7; exh. NPS-DW-3 at 24; exh. NPS-HH-2 at 11; tr. 11/6/06 at 34-35 (Linton), 36 (Johnson).

Economic Benefit to the State

[30 V.S.A. § 248(b)(4)]

39. The Project will result in an economic benefit to the state and its residents. This finding is supported by the following finding.

40. The Project would not impose a cost impact to the state or its residents, yet may provide valuable information that would help to reduce utility costs and increase efficiencies and reliability in the future. The Project may also demonstrate how a microgrid power system can lower the environmental burden of energy use. Lynch pf. at 13-14.

**Aesthetics, Historic Sites, Air and Water Purity,
the Natural Environment and Public Health and Safety**

[30 V.S.A. § 248(b)(5)]

41. The Project will not have an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment and the public health and safety, with due consideration having been given to the criteria specified in 10 V.S.A. § 1424a(d) and §§ 6086(a)(1) through (8) and (9)(K). This finding is supported by Findings 42 through 77, below.

Public Health and Safety

[30 V.S.A. § 248(b)(5)]

42. The Project will not have an undue adverse effect on the public health and safety. This finding is supported by the following finding.

43. The generation units that are part of the Project already exist and have been operating within the Mad River Park. Northern seeks to minimize any impacts by utilizing to the full extent possible all available, existing rights-of-ways, and will practice all standard safety requirements during construction and maintenance of the project. Clapp pf. at 12.

Air Pollution

[10 V.S.A. § 6086(a)(1)]

44. The Project will not result in undue air pollution. This finding is supported by Findings 45 through 48, below.

45. The Vermont Agency of Natural Resources ("ANR"), Department of Environmental Conservation, Air Pollution Control Division has determined that an Air Pollution Control Permit is not required for the Project. This determination by the ANR Air Pollution Control Division was made with the understanding that only the 267 kW propane generator would operate in excess of 200 hours per year, that this operation in excess of 200 hours would be only for the first year of the Project, and that thereafter the 267 kW generator would only serve as backup during planned and unplanned electric outages. If Northern wishes to operate the Project beyond the five years approved by today's CPG, Northern must again contact the ANR Air Pollution Control Division to determine Air Pollution Control Permit applicability at that time. Letter dated December 4, 2006, from Douglas Elliot, ANR, to Illari Vihinen, Northern.

46. The 30 kW and 100 kW generators would operate less than 200 hours per year. Tr. 11/6/06 at 24 (Johnson).

47. The 267 kW generator is equipped with a three-way pollution control catalyst. Letter dated December 4, 2006, from Douglas Elliot, ANR, to Illari Vihinen, Northern.

48. The increased energy efficiency of the Project would result in less fuel being used, and, therefore, emissions would be reduced. Lynch pf. at 7.

Headwaters and Water Quality

[10 V.S.A. §§ 1424a(d)(1)&(2) and § 6086(a)(1)(A)]

49. The Project will meet any applicable Health and Environmental Conservation Department regulation regarding reduction of the quality of the ground or surface waters flowing through or upon lands which are not devoted to intensive development. This finding is supported by the following finding.

50. The Project is not located in a headwaters region, and will therefore not impact headwaters or the watershed. Clapp pf. at 13.

Waste Disposal

[10 V.S.A. § 6086(a)(1)(B)]

51. The Project will meet any applicable Health and Environmental Conservation Department regulations regarding the disposal of wastes, and will not involve the injection of waste materials or any harmful or toxic substances into ground water or wells. This finding is supported by the following finding.

52. Northern does not propose to inject or dispose of waste or any harmful or toxic substances as part of this project. There will be no additional toilet facilities required by the Project, nor will the self-containerized equipment release or discharge waste or toxic substances into groundwater or wells. Clapp pf. at 13.

Water Conservation & Supply

[10 V.S.A. §§ 6086(a)(1)(C) and 6086(a)(2)&(3)]

53. The Project will not require a water supply, and will therefore have no impact on these criteria. Any necessary water required for fire suppression will be provided pursuant to labor and industry permits already obtained for the general office buildings. Clapp pf. at 13, 14.

Floodways, Streams, and Shorelines

[10 V.S.A. §§ 1424a(d)(3)&(12) and §§ 6086(a)(1)(D)(E) &(F)]

54. None of the Project components would be located in a 100-year flood boundary or floodplain. Clapp pf. at 13.

55. None of the Project components would be located within close proximity of a stream, nor would the project impact a stream in any way. Clapp pf. at 13; exh. NPS_TJC-1.

56. There are no shorelines within the project vicinity, and therefore the project will have no impact on shorelines. Clapp pf. at 14.

57. The Mad River is approximately 1,500 feet east of the Mad River Park, and is on the opposite side of Route 100 from the Mad River Park. Clapp pf. at 4, 12; exh. NPS_TJC-1.

Wetlands

[10 V.S.A. § 6086(a)(1)(G)]

58. The project will have no impact on wetlands. There are no Class 2 or 3 wetlands located in the general vicinity of the Project. The project will therefore not require permission or permits from the Army Corps of Engineers or the State of Vermont. Clapp pf. at 14; exh. NPS_TJC-1.

Soil Erosion

[10 V.S.A. § 6086(a)(4)]

59. There are three potential areas for earth disturbance: (1) WEC may replace a utility pole in place to support the fast switch; (2) if the fiber optic cable is employed rather than the radio communication system, the fiber optic cable would be located underground from North Fayston Road up to Northern's building; and (3) Northern may install cogeneration heating pipes between Northern's 267 kW generator and Northern's building (the 267 kW generator is located outside Northern's new office building). Clapp pf. at 10; Lynch pf. at 5; exh. NPS-TJC-2; tr. 11/6/06 at 58, 62-63 (Linton, Weston).

Discussion

Northern did not submit detailed information on the erosion prevention and sedimentation prevention steps it would undertake while performing the three activities mentioned above that may involve earth disturbance. Northern stated that the installation of the pipes to collect the waste heat is part of the project, and will eventually be completed. Northern has also stated that it would most likely install wireless radio communications, and therefore, that the fiber optic line would most likely not be necessary. WEC has stated that the pole replacement would most likely be necessary. From the information provided, the installation of the heat pipes would occur within a previously-disturbed area between two existing buildings in a business park complex. We will require Northern and WEC to take reasonable steps to minimize soil erosion due to the installation of the heating pipes and the utility pole. We will also require Northern to obtain permission from the Board if it plans to install the fiber optic cable, and to describe the earth disturbance that would take place and the erosion control measures to be employed.

Transportation Systems

[10 V.S.A. § 6086(a)(5)]

60. The Project will not cause unreasonable congestion or unsafe conditions with respect to local highways, which are the only affected transportation facilities. This finding is supported by the following finding.

61. There will be no impacts to any transportation system as a result of this project other than the incremental requirements for refueling the existing generators. Additional fuel, if any, required for the project should not materially exceed the services currently provided in this area, and therefore not require additional refueling trips. Clapp pf. at 5, 15.

Educational Services

[10 V.S.A. § 6086(a)(6)]

62. The Project will not cause an unreasonable burden on the ability of a municipality to provide educational services. This finding is supported by Findings 63 and 64, below.

63. None of the components associated with this proposal will negatively impact the local school system, and as such, there will be no adverse impact on the educational services of the area. As a Research & Development project, the MadGrid will provide local schools with an opportunity for students to become more informed on energy issues and the potential benefits of implementing microgrid (distributed generation) technology. Clapp pf. at 15.

64. There will be no requirement for additional personnel for Northern as a result of the Project. Clapp pf. at 5.

Municipal Services

[10 V.S.A. § 6086(a)(7)]

65. The Project will not place an unreasonable burden on the ability of the local governments to provide municipal or governmental services. This finding is supported by Findings 66 and 67, below.

66. The project will not require any municipal or governmental services. Clapp pf. at 15.

67. There will be no requirement for additional personnel for Northern as a result of the Project. Clapp pf. at 5.

**Scenic or Natural Beauty, Aesthetics, Historic Sites,
and Rare and Irreplaceable Natural Areas**

[10 V.S.A. §§ 1424a(d)(7) through (11) and § 6086(a)(8)]

68. The Project will not have an undue adverse effect on the scenic or natural beauty, aesthetics, historic sites, or rare and irreplaceable natural areas. This finding is supported by Findings 69 through 74, below.

69. The only Project components which would be visible to the public are the fast switch, and either the wireless radio communications link or the fiber optic communications line, whichever is chosen to be employed. Clapp pf. at 10, 16-17; tr. 11/6/06 at 10-11.

70. The fast switch is relatively small and is not different in size, shape or character from distribution transformers, regulators, and other electrical equipment already visible in this area and throughout the region and State of Vermont. Clapp pf. at 17; exh. WEC_DW-1.

71. WEC may replace the pole upon which the fast switch would be installed. The replacement pole would be five feet taller than the existing pole to adequately observe proper clearances. The replacement pole would likely be a 50-foot pole, with seven feet buried and 43 feet above ground. Tr. 11/6/06 at 63 (Weston).

72. If Northern uses the wireless radio communication link rather than the fiber optic communication link, the installation of the radio equipment would not require a taller utility pole. The same type of radio units are already in place on poles in WEC's system. Tr. 11/6/06 at 64 (Weston).

73. If Northern chooses to use the fiber optic cable, rather than the radio communications link, the fiber optic cable is relatively small in diameter (approximately 1/2 inch in diameter, which is smaller than an electric distribution conductor). Clapp pf. at 10, 17.

74. There are no historic sites or rare and irreplaceable natural areas in the general vicinity of the Project. Clapp pf. at 17.

Discussion

Given the facts of this case, we find that the Project will not have an adverse impact on aesthetics, and that no further analysis regarding aesthetic impacts under this criterion is necessary. This finding is based upon our conclusions that the Project would generally not be

visible to the public. The fast switch and radio communication link are approximately the same size, shape, and character of the electrical equipment already located on utility poles in the area. If the fiber optic cable is employed, the portion of the cable that would be above-ground would be located on existing utility poles and would appear consistent with the utility lines already on poles in the area.

Necessary Wildlife Habitat and Endangered Species

[10 V.S.A. §§ 1424a(d)(4) through (6) and § 6086(a)(8)(A)]

75. The Project will not impact, destroy, or imperil necessary wildlife habitat or any endangered species. The Project is located in an existing business park that does not contain, nor is it near, sensitive environmental habitat or species. Clapp pf. at 17-18.

Development Affecting Public Investments

[10 V.S.A. § 6086(a)(9)(K)]

76. The Project will not unnecessarily or unreasonably endanger the public or quasi-public investments in any governmental or public-utility facilities, services, or lands, or materially jeopardize or interfere with the function, efficiency, or safety of, or the public's use or enjoyment of or access to, such facilities, services, or lands. This finding is supported by the following finding.

77. There are no nearby public facilities as defined by this criterion other than the WEC facilities and public roads. The Project is designed to enhance WEC's facilities, and the Project will not impose any further impacts on the road network. Clapp pf. at 18.

Least-Cost Integrated Resource Plan

[30 V.S.A. § 248(b)(6)]

78. WEC's Long Range Plan, which was incorporated into WEC's Integrated Resource Plan approved by the Board in Docket 6896 ⁴, referenced WEC's participation in the Project as part of the strategic placement of distribution facilities. Weston pf. at 4.

79. Because Northern is not a company subject to the Board's jurisdiction (*see* Section II, above), Northern is not obligated to prepare and submit for approval an integrated resource plan.

4. *See* Order of 6/15/05.

Compliance with Electric Energy Plan

[30 V.S.A. § 248(b)(7)]

80. The Project is consistent with the Vermont Electric Plan. This finding is supported by Findings 81 and 82, below.

81. The 2005 Vermont Electric Plan promotes the concept of distributed utility planning and urges utilities to begin exploring how the concept can be integrated into their plans and systems. Weston pf. at 10-11.

82. Northern's request to construct the Project is consistent with the Vermont Electric Plan provided that Northern's actions in this matter are consistent with its petition and testimony, and further provided that Northern's actions are consistent with its November 13, 2006, letter to the Board. DPS determination under 30 V.S.A. § 202(f), dated December 18, 2006.

Outstanding Resource Waters

[30 V.S.A. § 248(b)(8)]

83. There are no streams or other waters within close proximity to this proposal, and, therefore, the Project would have no impact under this criterion. Clapp pf. at 12; exh. NPS_TJC-1.

Waste to Energy Facilities

[30 V.S.A. § 248(b)(9)]

84. The Project is not a waste-to-energy facility, and therefore this criteria is not applicable.

Existing or Planned Transmission Facilities

[30 V.S.A. § 248(b)(10)]

85. The Project can be served economically by existing or planned transmission facilities without undue adverse effect on Vermont utilities or customers. No upgrades would be necessary. Crocket pf. at 11; Weston pf. at 13.

IV. CONCLUSION

Based upon all of the above evidence, we conclude that the Project is of limited size and scope; the petition does not raise a significant issue with respect to the substantive criteria of 30 V.S.A. § 248; the public interest is satisfied by the procedures authorized by 30 V.S.A. § 248(j); and the proposed Project will promote the general good of the state.

V. ORDER

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Public Service Board of the State of Vermont that the construction of an energy generation and distribution network known as the MadGrid Project in Waitsfield, Vermont, in accordance with the evidence and plans presented in this proceeding, will promote the general good of the State of Vermont in accordance with 30 V.S.A. Section 248(j), and a certificate of public good shall be issued in the matter, subject to the following conditions:

1. Construction, operation and maintenance of the project shall be in accordance with the plans and evidence submitted in this proceeding.
2. Northern shall closely monitor, in conjunction with WEC, the harmonic output under actual operating conditions during the commissioning of the Project. Northern shall take appropriate actions to ensure that the Project does not exceed an appropriate level of harmonic output.
3. Northern shall not export power onto the WEC distribution system outside of the MadGrid without prior approval of the Board.
4. Northern and WEC shall take reasonable steps to minimize soil erosion due to the installation of the heating pipes and the utility pole. In addition, if Northern wishes to install the fiber optic cable, Northern must obtain prior permission from the Board, and must describe the earth disturbance that would take place and the erosion control measures to be employed.
5. The certificate of public good shall not be transferred without prior approval of the Board.

Dated at Montpelier, Vermont, this 31st day of January, 2007.

<u>s/James Volz</u>)	
)	PUBLIC SERVICE
)	
<u>s/David C. Coen</u>)	BOARD
)	
)	OF VERMONT
<u>s/John D. Burke</u>)	

OFFICE OF THE CLERK

FILED: January 31, 2007

ATTEST: s/Susan M. Hudson
Clerk of the Board

NOTICE TO READERS: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Board (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address: psb.clerk@state.vt.us)

Appeal of this decision to the Supreme Court of Vermont must be filed with the Clerk of the Board within thirty days. Appeal will not stay the effect of this Order, absent further Order by this Board or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Board within ten days of the date of this decision and order.